



PLANNING FOR PROFIT



Ministry of Agriculture,
Food and Fisheries

Ginseng - Southern Interior Spring 2000

This information is a tool to project costs and returns for B.C. farm enterprises and is a general guide to plan individual farm operations.

The sample budget should be used as a guide only and should not be used for business analysis. Each farm should develop their own budget to reflect their production goals, costs and market prices.

Information regarding financial planning and other enterprise budgets may be downloaded from the internet at <http://fbminet.ca/bc> or obtained from your local office of the B.C. Ministry of Agriculture, Food and Fisheries.

Market Factors

The ginseng industry has experienced some price volatility in recent years due to increased production volumes and a slowing in the market distribution system.

Producers are increasingly investigating value-added processing for ginseng. Product development continues to take place with ginseng tea, novel beverages and nutraceuticals.

Key Success Factors

- Supply stabilization
- Market distribution channel maturation
- Processed product market development
- Increased yields per acre

Risk Factors & Strategies

- Fungal infections continue to cause problems in some production areas, especially in wet years. Ginseng production is best located in warm, dry climates with south facing slopes and well-

drained, sandy loam soil. Timely applications of appropriate fungicides will reduce the incidence of disease.

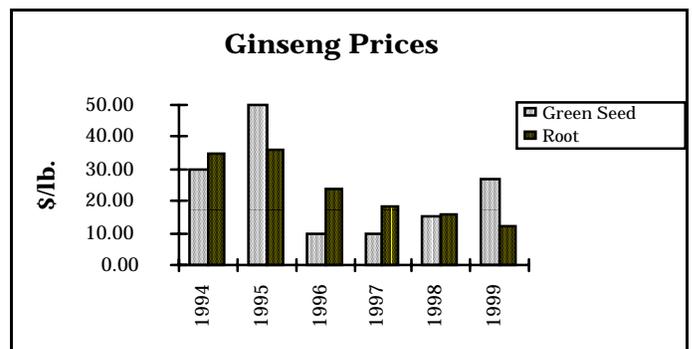
- Pesticide residue standards differ in Canada and the U.S.A.. In Canada, the maximum residue limit has been set at 1 ppm but in the U.S., is set at 10 ppb. Strategies to reduce pesticide residues to meet the current U.S. standard include research to develop super critical CO₂ extraction techniques to produce “pesticide residue free” ginseng value-added products (powdered ginseng and ginseng extracts) for export into the U.S. Another management technique is the use of different chemicals for disease control.

Production Targets

- Root yields in Year 4 of 2,800 lbs./acre
- Seed yields in Year 4 of 400 lbs./acre
- Total Labour:

| | |
|---------------------|--------------|
| Year 1 (planting) | 49 hrs/acre |
| Year 2 | 128 hrs/acre |
| Year 3 | 64 hrs/acre |
| Year 4 | 124 hrs/acre |
| Year 5 (harvesting) | 363 hrs/acre |

The above indicators are provided for comparison purposes and are set out as potential production targets.



Sample Enterprise Budget and Worksheet

The sample enterprise budget provided should be viewed as a first approximation only. Use the column "Your Estimate" to add, delete and adjust items to reflect your specific production situation.

The sample budget is based on interviews with producers and BCMAF commodity specialists. Cost estimates are based on standard practices in the area and do not represent any particular farm.

| | Your Planting Estimate | Year 1 1st Grow Estimate Yr | Your Year 2 Estimate 2nd Grow Yr | Your Year 3 Estimate 3rd Grow Yr | Your Year 4 Estimate Harvest | Your Estimate |
|----------------------------------|---------------------------|---|--|--|---------------------------------------|------------------|
| Projected Income | | | | | | |
| Seed | \$0 | \$0 | \$0 | \$0 | \$0 | |
| Root | 0 | 0 | 0 | 0 | 39,200 | |
| Projected Direct Expenses | | | | | | |
| Stratified Seed | \$3,000 | \$0 | \$0 | \$0 | \$0 | |
| Irrigation System* | 1,500 | | | | | |
| Fertilizer | 100 | 100 | 100 | 100 | 100 | |
| Pest Control | | | | | | |
| Fumigation | 20 | | | | | |
| Herbicide | 30 | 30 | 30 | 30 | 30 | |
| Fungicide | | 350 | 350 | 350 | 350 | |
| Insecticide | | 50 | 50 | 50 | 50 | |
| Straw Mulch | 700 | 100 | | | | |
| Posts & Anchors* | 212 | | | | | |
| Cable System* | 2,500 | | | | | |
| Shade Cloth* | | 9,000 | | | | |
| Machinery Operations | | | | | | |
| Fuel, Oil, Lubrication | 156 | 46 | 46 | 46 | 87 | |
| Repairs & Maintenance | 309 | 617 | 617 | 617 | 617 | |
| Labour | | | | | | |
| Layout and Set-Up | 270 | | | | | |
| Hand Weeding | | 400 | 240 | 240 | 160 | |
| Install/Pull Shade Cloth | | 440 | 120 | 120 | 120 | |
| Roll/Remove Shade Cloth | | 120 | 120 | 120 | 300 | |
| Harvesting - Berries/Flowers | | | | 400 | 800 | |
| Remove Posts & Cables | | | | | 160 | |
| Harvesting - Root | | | | | 800 | |
| Washing - Root | | | | | 256 | |
| Rack & Unrack Dryer | | | | | 280 | |
| Marketing | | | | | 1,960 | |
| Total Direct Expenses | \$8,797 | \$11,253 | \$1,673 | \$2,073 | \$6,071 | |

Assumptions—Ginseng - 10 Acres

The following assumptions were made in calculating the sample budget:

- 1 acre of a ten acre ginseng operation growing in the Southern Interior.
- The operation is well managed.
- Target Yield of 400 lbs/acre of seed in the 4th year. Sufficient seed for the operation's replanting program is harvested. Seed is assumed not to be sold. Flowers are removed on the balance.
- Target Yield of 2,800 lbs/acre of root (dried) in the 4th year.
- Price of \$14.00/lb.
- Machinery Costs (fuel, oil and lube) are for the following operations: Field Preparation (plowing, disking and bed forming) (Year 1) Layout (Year 1), Seeding (Year 1), Post & Cable Installation (Year 1), Fertilization (Year 1+), Herbicide Application (Year 1-5), Fungicide Application (Year 2-5), Insecticide Application (Year 2-5) and Root Harvesting (Year 5).
- Labour costs are calculated at \$8.00/hr of hand weeding and berry picking and at 10.00/hour for layout, post and cable installation and removal, shade cloth installation, unrolling and removal and racking and unracking the dryer. Labour costs include UIC, CPP and WCB for all other operations.
- All other labour operations are performed by the operation owners.

Calculation of Projected Net Income

To assess the net income of an enterprise, **indirect expenses** must be subtracted from income. Indirect expenses do not vary with the level of output and are typically associated with inputs used in more than one enterprise and must be allocated appropriately (prorated) between uses.

| | |
|---|---------|
| Projected Income | |
| Less Projected Direct Expenses | - |
| = Projected Contribution Margin | = |
| Less Projected Indirect Expenses | |
| Depreciation (e.g., buildings and equipment) | - |
| Interest | - |
| Other Indirect Expenses (e.g., operator labour) | - |
| = Projected Net Income | |

Building & Machinery Replacement Cost

| | | |
|------------------------------|------------------|--|
| Buildings ¹ | \$25,000 | ¹ Accomodates equipment and supply storage, washing area, dryers and workshop |
| Power Machinery ² | 25,000 | ² New 45 Hp tractor, modified |
| Field Machinery ³ | 51,600 | ³ Plow, disk, fertilizer spreader, sprayer, bed shaper, mulch spreader, post pounder, seeder, digger, washer, dryer |
| Irrigation | 5,000 | |
| Posts & Cables | 21,700 | |
| Shade Cloth | 45,000 | |
| Washer | 5,000 | |
| Dryer | 30,000 | |
| Vehicle | 20,000 | |
| Other | <u>2,500</u> | |
| Total | \$230,800 | |

Labour Requirements

| Year 1 | | Year 2 | | Year 3 | |
|-------------------------|-----------|---------------------|-----------|---------------------|-----------|
| Field Preparation | 8 | Install Shade Cloth | 32 | Pull Shade Cloth | 12 |
| Bed Shaping & Packing | 3 | Unroll Shade Cloth | 12 | Fertilize | 2 |
| Plant | 6 | Apply Mulch (hand) | 12 | Pest Control | 8 |
| Mulch | 3 | Fertilize | 2 | Hand Weed | 30 |
| Fertilize | 2 | Pest Control | 8 | Roll Shade Cloth | <u>12</u> |
| Herbicide Application | 2 | Hand Weed | 50 | Total Year 3 Labour | 64 |
| Install Posts & Anchors | <u>25</u> | Roll Shade Cloth | <u>12</u> | | |
| Total Year 1 Labour | 49 | Total Year 2 Labour | 128 | | |

| Year 4 | | Year 5* - Harvest | | Year 5* - Harvest (continued) | |
|---------------------|-----------|---------------------|-----|--------------------------------|-----------|
| Unroll Shade Cloth | 12 | Unroll Shade Cloth | 12 | Harvest Root | 100 |
| Fertilize | 2 | Fertilize | 1 | Wash Root | 32 |
| Pest Control | 8 | Pest Control | 2 | Rack Dryer | 16 |
| Hand Weed | 30 | Hand Weed | 20 | Sort and Store | <u>12</u> |
| Harvest - Seed | 50 | Harvest - Seed | 100 | Total Year 5 Labour | 363 |
| Wash - Seed | 5 | Wash - Seed | 10 | | |
| Seed Stratification | 5 | Seed Stratification | 10 | | |
| Roll Shade Cloth | <u>12</u> | Remove Shade Cloth | 30 | | |
| Total Year 4 Labour | 124 | Remove Posts | 16 | | |
| | | Remove Straw | 2 | | |

*Excluding Marketing

Sensitivity Analysis—

The profitability of a ginseng operation will depend strongly on successful marketing and strong production management.

The table below illustrates the changes to returns resulting from a change in price.

The table below illustrates the changes to returns resulting from a change in price.

| Income | Ginseng Root Yield | | |
|--------|--------------------|--------------|---------------|
| | 2,000 lbs/Acre | 2,800 | 3,200 |
| Year 4 | 21,929 | 28,929 | 33,129 |

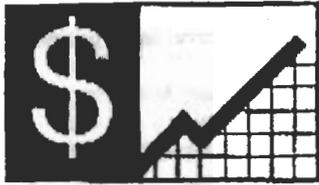
| Income | Ginseng Root Prices \$/lb. | | |
|--------|----------------------------|--------|---------------|
| | 8.00 | 11.00 | 14.00 |
| Year 4 | 16,329 | 24,729 | 33,129 |

The table below illustrates the changes to income-expenses resulting from a change in labour costs.

| Income - Expenses | Labour Cost | | | |
|-------------------|-------------|----------------|---------|---------|
| | 8.00 | 10.00 | 12.00 | 14.00 |
| Planting | -8,743 | -8,797 | -8,851 | -8,905 |
| Year 1 | -11,141 | -11,253 | -11,565 | -11,777 |
| Year 2 | -1,625 | -1,673 | -1,841 | -1,949 |
| Year 3 | -2,025 | -2,073 | -2,441 | -2,649 |
| Year 4 | 33,301 | 33,129 | 31,949 | 31,273 |

For More Information

- Al Oliver, P.Ag., Special Crops Development Specialist, BCMAF, Kamloops 250-371-6050
- Howard Joynt, P.Ag., Financial Management Specialist, BCMAF, Vernon 250-260-3000



Farm Management FACTSHEET

199F-01

Farm Management Branch

Agdex 810

◆ GINSENG LEASING ◆

Assume Nothing is the opening statement of one landlord that was interviewed to make this checklist possible. Although not every possibility can be covered and not every situation foreseen the following is a checklist of items that should be considered by the landlord or the tenant before writing a lease document. Consider each item. Tick the items that apply to your situation and use them as a base for discussion and an eventual written agreement. The nature of the crop to be planted on the land will have a strong influence on the structure of the lease. Ginseng has the following characteristics that should be considered before a lease is completed

Time

Ginseng requires one full year of land preparation before planting.

Ginseng is typically harvested between 3 and 6 years after planting

Structures

Ginseng requires semi-permanent fixtures (post and anchors wire, shade cloth)

Traffic

Hired labour is required for good crop management. There will be steady to and from traffic and occasional periods of high traffic.

Crop Husbandry

A large investment is being made to establish a ginseng crop. Judicial use of approved pesticides and a priority for timely water application will be required.

◆ Security of Lease Land

- Does the person you are dealing with own the land?
- Whose name(s) are on the title?
- What happens to the lease if the title changes hands?
- Does the tenant have the "right of first refusal" if the land is for sale?
- What happens if either party dies, goes bankrupt or fails to make payments?

- What other easements/right-of-ways exist on the land? (hydro, phone, gas, third party access, First Nation's rights)
- Do you have a legal description of the land you wish to lease?
- What happens if you are leasing only a portion of a legal title?
- Does the tenant have the right to lease more parcels or more area in the same parcel in the future?
- Does tenant have right to sublease?

Special note: Land leased for more than three years must be registered with Land Titles. If you are leasing only part of a legal title, an application to the Agricultural Land Commission (ALC) is required. The ALC will require an explanatory plan, by legal survey, to be registered with the title. As an option to completing a survey, the entire farm may be leased with unused portion being subleased back to the landlord for a nominal fee.

◆ Start Up and Termination of Lease

- When does the lease start?
- When does it stop?
- What notice is required by each party?
- What reasons could there be for termination?
- What compensation could there be for termination?

◆ Lease Fee

- How much of the land being leased is used for crop?
- How much of the land being leased is used for headlands, cable support roadways, parking, machine storage, chemical storage?

Special Note: An actual 10-acre ginseng garden will require approximately an additional 20% space for the above.

- What is the total acreage being leased?
- Will there be one fee per acre or different fees for different uses?
- When will payment be made? All at once; partial payment at beginning of crop year remainder at another time.
- Who pays taxes?



BRITISH COLUMBIA Ministry of Agriculture, Food and Fisheries

- If further land is to be leased, is the rate the same or what would cause changes to rate?

◆ Water

- Are there sufficient, current legal water rights available for the crop(s) needed
 - In whose name are they?
 - Who maintains the licence?
 - Who pays water rights licence fee?
 - Is the condition of existing water delivery equipment (pumps, lines, etc) adequate for the needs of ginseng and other crops?
 - Is the quality of the water suitable for ginseng and other crops?
 - Who pays for water testing?
 - What happens if the usual water source (well) runs dry?
 - Who pays for upgrading of water delivery equipment and or additional water sources?
 - Who has priority to water access?
- Special Note: In extreme heat mature ginseng will require small but frequent amounts of daytime water for cooling. During establishment and soil preparation water use may be greater than normal. Once established water use will be less than for an equivalent size forage crop.*
- When is the water available in the spring?
 - When is the water shut off in the fall?
 - Are there special charges for early and late water access and who pays them?
 - Will there be a water fee over and above the land lease fee?
 - Once established water use will be considerably less than for an equivalent size forage crop.
 - Who pays hydro bill?

◆ Soil and Land Use

- Will testing be done before and after for residual pesticides and at whose expense?
- Can soil amendments be made?
- What condition must the cropped soil be left in at end of lease?
- What condition must the headland, storage and roadways soil be left in at end of lease? (in consideration of potential soil compaction)
- Should the crop residue be removed or replaced and worked into the soil after harvest?
- What plans are in place for potential soil erosion?
- Who will be responsible for rock removal after ginseng harvest?

◆ Risk and Security

- Who carries third party liability insurance?
- Should cross liability be discussed between insurance agencies?

- Is crop insurance necessary to cover lease payments and or crop loss?
- Is insurance necessary on landlord buildings that are used to store tenant equipment?
- Who supplies bathrooms, what types of bathrooms and/or sewage disposal?
- What gates and locks are required?
- Is a separate entrance to the ginseng garden required?
- Does the landlord wish to share in the risk and plant some ginseng in lieu of lease payments?
- Do you clearly understand the terms and conditions of the written lease?
- Does the tenant have the right to manage the crop without interference?
- Can the land be subleased with landlord's permission?
- Are there potential urban conflicts?

◆ Structures

- What structures will be erected?
- Who is responsible for their removal?
- Can they be purchased by the landlord at the end of the lease?
- To what extent should PVC pipe be removed from the garden area and by when?

◆ Pest Control/Chemical Use

- Who is responsible for identification and control of perimeter pests?
- Limitation of crops in proximity of ginseng.
- Who is responsible for fencing costs and removal if required?
- What notification of pesticide use, if any, is required?
- Who is responsible for chemical storage to WCB guidelines?
- Who is responsible for posting of chemical use to WCB guidelines?

◆ Taxation

- Are you in the business of farming or are you in the business of renting land (Revenue Canada)?
- Will you be able to maintain farm status (BC Assessment Authority)?

◆ Other

- What crops are best suited before and after ginseng?

Prepared by:

Prepared by: Howard Joynt
 Al Oliver
 British Columbia
 Ministry of Agriculture,
 Food and Fisheries
 Kamloops
 250 371-6059

PANAX — INTERNET DISCUSSION GROUP

The British Columbia Ministry of Agriculture, Food and Fisheries, and University College of the Cariboo in Kamloops, British Columbia invite your participation in PANAX — a discussion group for people involved in the production, processing and use of *Panax spp.* and Siberian ginseng. We look forward to an exchange of information on primary and value-added production as well as research and extension.

For further information, contact:

Al Oliver, BSA, P.Ag.
Industry Specialist
British Columbia Ministry of Agriculture,
Food and Fisheries
Kamloops, British Columbia, Canada
Telephone: 250 371-6059
Fax: 250 828-4631
Email: al.oliver@gems3.gov.bc.ca

1. To sign on to PANAX, address an internet email message to:

mailserv@cariboo.bc.ca

In the body of the message, type the one-line command:

Subscribe panax Firstname Lastname (your first and last name)

The computer will then send you some information

2. To communicate with the group with questions, answers or comments, address your messages to:

panax@cariboo.bc.ca

This will send a message to the whole group, or, if you want to send a personal message or question you will have to use their personal email address. These can be found by asking the computer for a list — see #3 below

3. To get list of subscribers address message to:

mailserv@cariboo.bc.ca

In body of message type:

Send/List PANAX

4. To unsubscribe address message to:

mailserv@cariboo.bc.ca

In body of message type:

unsubscribe PANAX

| | | | | | | | |
|---|--|-------------------------------------|--|--|--|---|--|
| Exporter's name, address, telephone | | Exporteur / nom, adresse, téléphone | | APPLICATION FOR PERMIT TO EXPORT ENHANCED SPECIES | | DEMANDE DE LICENCE POUR EXPORTER DES ESPÈCES MENACÉES D'EXTINCTION | |
| Consignment or final destination (Form No. 5503-94/01) | | | | Destination / (adresse de destination / final address) | | AGRICULTURE CANADA No. of the certificate of exportation | |
| Applicant's name (Form No. 5503-94/01) | | | | Applicant's name (Form No. 5503-94/01) | | License valid for a term of exportation: <input type="checkbox"/> Exporter <input type="checkbox"/> Exporteur | |
| Country of final destination (Form No. 5503-94/01) | | | | Country of final destination (Form No. 5503-94/01) | | License valid for a term of exportation: <input type="checkbox"/> Applicant <input type="checkbox"/> Exporteur | |
| This undertaking hereby certifies that all information given in this application is true and correct. | | | | Le soussigné certifie que tous les renseignements fournis dans cette demande de licence sont exacts. | | | |
| Signature | | | | | | | |

| Quantity (Amount) | Species (Espèces) | Scientific name (N.S.P. No.) (Nom scientifique (numéro national)) | Country (Pays) | Sex (Sexe) | Size and Age (Taille et âge) |
|---|-------------------|---|----------------|------------|------------------------------|
| <p>See information on page 133 regarding exporting ginseng from Canada.</p> | | | | | |

| | | | | | |
|--|--|-----------------------------------|--|-------------|--------------------|
| For Government Use Only — À l'usage du ministère des Pêches | | | | | |
| Signature and stamp of issuing authority | Signature of holder (with date of receipt of copies) | Country name of exporting country | Person to be shown on copy certificate | Form No. | No. de la licence |
| Checked by Director of Cup (where copies are returned to Department) | Noted per le Directeur de la licence (où les copies retournées au Ministère) | Date stamp of copy of receipt | Date de date de retour de la licence | Export Date | Date d'exportation |
| | | | | Form No. | Classement |

5 Personal (Commercial) Copy — Copie de renseignements personnels

PESTICIDE RESIDUE MONITORING IN BRITISH COLUMBIA

Monitoring Pesticide Residues in Food

Pesticide residues in food are regulated by the Canadian Food Inspection Agency (CFIA). This agency determines how much residue can safely be allowed to remain on raw food, before any further preparation. Food preparation significantly reduces pesticide residues in foods offered for sale. However, other agencies, namely Agriculture and Agri-Food Canada, the British Columbia Ministry of Agriculture, Food and Fisheries and the British Columbia Ministry of Water, Land and Air Protection also test food for pesticide residues and contributed to the results in this report.

These agencies routinely collect food samples that are tested for up to 130 pesticides. Both domestic and imported foods are checked. The sampling programs are coordinated to make sure a wide variety of foods in the marketplace are tested. Each agency does additional sampling and testing for special for special investigations and projects.

Maximum Residue Limits (MRLs)

The amount of pesticide residues that are legally allowed on food are called Maximum Residue Limits. They apply to domestic and imported food. Maximum Residue Limits are designed to ensure that everybody can eat all foods over a lifetime and not suffer adverse effects.

Maximum Residue Limits are established by estimating the toxicity and the potential exposure to the chemical. Exposure from food and other sources is considered. A significant safety margin is built into the Maximum Residue Limits value. Therefore, Maximum Residue Limits do not necessarily indicate a health hazard.

Maximum Residue Limits are measured in parts per million (ppm). An example of 1 ppm is the relative weight of one paper clip to a compact car. Maximum Residue Limits range from 0.001 ppm to 110 ppm depending on the pesticide and the type of food.

Consequence of Excessive Residues

If residues above the Maximum Residue Limits are found in domestic food, Health CFIA Canada takes the appropriate action (e.g. warnings, stopping the sale of food, destruction of food or prosecution). The various government agencies work with the grower to correct the problem and prevent it from happening again. The grower's produce will also be tested more frequently.

If residues above the Maximum Residue Limits are found in imported food, Health and Welfare Canada will take appropriate action, as described earlier, or refuse to import the food. Products from the particular importer will be monitored for several years and shipments will have to be certified to ensure they do not have residues above Maximum Residue Limits

When testing for pesticide residues the following three categories will be used:

- **NO RESIDUE** the percentage of food samples in which no pesticide residues were detected. Analytical methods can detect pesticide residues well below the MRLs.
- **- MRL** the percentage of food samples with pesticide residues less than or equal to the MRLs.
- **> MRL** the percentage of food samples with pesticide residues greater than the MRLs.

If you require additional information, please contact:

Canadian Food Inspection Agency
Kelowna: 250 470-4899
New Westminster: 604 666-2062

THE METRIC SYSTEM

Linear Measures

10 millimetres (mm) = 1 centimetre

100 centimetres = 1 metre (m)

100 metres = 1 kilometre

Square Measures (area)

100 m X 100 m = 10,000 m² = hectare (ha)

100 ha = 1 square kilometre (km²)

Cubic Measures (volume)

Dry Measure

1,000,000 cm³ = 1 cubic metre (m³)

Liquid Measure

1000 millilitres (mL) = 1 litre (L)

100 L = 1 hectolitre (hL)

Weight — Volume Equivalents (for water)

(1.00 kg) 1000 grams = 1 litre (1.00 L)

(0.50 kg) 500 g = 500mL (0.50 L)

(0.10 kg) 100 g = 100 mL (0.10 L)

(0.01 kg) 10 g = 10 mL (0.01 L)

Weight Measures

1000 milligrams (mg) = 1 gram (g)

1000 g = 1 kilogram (kg)

1000 kg = 1 tonne (t)

1 mg/kg = 1 part per million (ppm)

Dry - Liquid Equivalents

1 cm³ = mL

1 m³ = 1000 L

Distance and Other useful Measurements

miles/hour x 88 = ft/second

miles/hour x 1.609 = km / hour

m² x 10.76 = ft²

kg x 2.205 = lbs

gallons (US) x .83267 = gallons (Imp)

kg/ha x .89 = lbs/ac

lbs/ac x 1.121 = kg/ha

METRIC TABLES

| Imperial Units | Conversion Factor | Metric Units | Imperial Units | Conversion Factor | Metric Units |
|--------------------|-------------------|---------------------------------------|---|-------------------|-------------------|
| LENGTH | | | oz./acre | 70 | g/ha |
| inches | 2.5 | centimetres (cm) | lb./acre | 1.12 | kg/ha |
| feet | 30 | centimetres (cm) | bu./acre | 0.9 | hL/ha |
| feet | 0.3 | metres (m) | tons/acre | 2.24 | t/ha |
| yards | 0.9 | metres (m) | fl. oz./acre | 70 | mL/ha |
| miles | 1.6 | kilometres (km) | pt./acre | 1.4 | L/ha |
| AREA | | | qt./acre | 2.8 | L/ha |
| square inches | 6.5 | square centimetres (cm ²) | gal./acre | 11.2 | L/ha |
| square feet | 0.09 | square metres (m ²) | gal./acre (US) | 9.35 | L/ha |
| acres | 0.40 | hectares (ha) | plants/acre | 2.47 | plants/ha |
| VOLUME | | | oz./gal. | 6.2 | mL/L |
| cubic inches | 16 | cubic centimetres (cm ³) | lb./gal. | 0.1 | kg/L |
| cubic feet | 0.03 | cubic metres (m ³) | oz./sq.ft. | 305 | g/m ² |
| cubic yards | 0.8 | cubic metres (m ³) | lb./sq.ft. | 4.9 | kg/m ² |
| fluid ounces | 28 | millilitres (mL) | oz./ft.row | 93 | g/m row |
| pints | 0.57 | litres (L) | lb./ft.row | 1.5 | kg/m row |
| quarts | 1.1 | litres (L) | ft./sec. | 0.3 | m/s |
| gallons (Imperial) | 4.5 | litres (L) | m.p.h. | 1.6 | km/h |
| gallons (U.S.) | 3.75 | litres (L) | p.s.i. | 6.9 | kPa |
| bushels | 0.36 | hectolitres (hL) | | | |
| WEIGHT | | | To convert from imperial to metric, multiply by the conversion factor. For example: 10 inches x 2.5 = 25 centimetres To convert from metric to imperial, divide by the conversion factor. For example: 25 centimetres ÷ 2.5 = 10 inches Imperial Conversions: 1 Grain = 0.0648 Grams 1 oz. = 28.35 grams = 437.5 grains | | |
| ounces | 28 | grams (g) | | | |
| pounds | 0.45 | kilograms (kg) | | | |
| short tons | 0.9 | tonnes (t) | | | |

Useful Measurements

- | | |
|---|-----------------------------------|
| 1 Imperial gallon = 4 quarts = 8 pints = 160 fluid ounces = 10 pounds of water = approximately 1.2 U.S. gallons | 1 square foot = 144 square inches |
| 1 U.S. gallon = .8345 or approximately 5/6 Imperial gallon = 8.3 pounds | 1 mile an hour = 88 feet a minute |
| 1 Imperial pint = 20 fluid ounces = 570 mL | 1 cubic yd = 27 cubic feet |
| 1 U.S. pint = 16 fluid ounces = 475 mL | |
| 1 pound = 16 ounces | |
| 1 tablespoon = 3 teaspoons = 14 mL | |
| 2 tablespoons = 1 fluid ounce = 28 mL | |
| 1 pound in 100,000 gallons of water = 1 ppm (part per million) | |
| 1 mile = 5,280 feet = 1,760 yards | |
| 1 yard = 3 feet = 36 inches | |
| 1 foot = 12 inches | |
| 1 acre = approximately 209 by 209 feet or 43,560 square feet. | |
| 1 square yard = 9 square feet | |

Parts Per Million

1 per cent = 10,000 parts per million

Imperial:

1 fl. oz./gallon = 6250 ppm.

1 gallon in 1,000,000 gallons of water = 1ppm

1 litre in 1,000,000 litres of water = 1ppm = 1 mL/1,000 L

Metric:

1 mg/litre (water) = 1 ppm

1 g/litre (water) = 1000 ppm

1 mL/litre = 1000 ppm

Metric Units for Farm Sprayers

| Tank Capacities | | | | Pressures | |
|-----------------|--------------|---------|--------------|------------------------------|---------------------|
| Imp. gal | = litres (L) | US gal. | = litres (L) | pounds per square inch (psi) | = kilopascals (kPa) |
| 100 | 455 | 100 | 379 | 10 | 70 |
| 200 | 910 | 200 | 758 | 15 | 100 |
| 250 | 1138 | 250 | 948 | 20 | 140 |
| 300 | 1365 | 300 | 1137 | 25 | 175 |
| 400 | 1820 | 400 | 1516 | 30 | 200 |
| 500 | 2275 | 500 | 1895 | 35 | 240 |
| 600 | 2730 | 600 | 2274 | 40 | 275 |
| 800 | 3640 | 800 | 3032 | 45 | 310 |
| 1000 | 4550 | 1000 | 3790 | 50 | 345 |

PESTICIDE APPLICATION OPTIONS

Spray Volume

Spray volume is the recommended amount of spray mixture to be applied to a specific area. This spray mixture is usually a pesticide diluted in water. Before mixing a pesticide in water in a sprayer, the delivery rate (actual amount of spray mixture applied to a specific area) should be measured. Once the delivery rate is measured it should be compared to the spray volume to see if it is suitable.

The measured delivery rate and sprayer tank volume is used to calculate how many acres are sprayed with one tank. Then the amount of pesticide to add to the sprayer tank can be calculated.

The amount of water to use will depend on the stage of plant growth, the severity of the pest or disease, the pesticide and the method of application.

When spraying foliage with protectant fungicides Bravo, Dithane, Dyrene and Rovral, thorough uniform coverage is essential for good disease control. Aliette is a systemic fungicide and thorough, uniform coverage is not essential as it will be translocated within the plant to all plant parts. All of these products indicate that they can be used as a concentrate (reduced spray volume) spray in their general instructions or instructions for crops other than ginseng.

Tests at the Delhi Research Station in Ontario used a boom sprayer equipped with overhead nozzles and drop-pendants with nozzles directed into the sides of the beds from the wheel track (refer to Figure 30). The tests measured good fungicide spray coverage in three year old Ontario ginseng with spray volumes as low as 700 L/ha (270 L/acre). To achieve the lower spray volumes, smaller nozzles were used which produce finer droplets at similar forward speeds and nozzle pressures.

Some of the label spray volumes are high enough to cause runoff on mature crops of ginseng. Growers with regular booms may wish to reduce the spray volume to prevent runoff. More concentrated sprays (or, lower spray volume/acre) may be attempted if the spray booms are equipped with drop-pendants. Spray volumes for one and two year old ginseng could be half of the rate for mature (4 year old) gardens. Refer to Table for guidance on spray volumes for use in spraying ginseng. These volumes are suggestions only, and are based upon observation and discussions with growers. Further research is required to develop recommendations.

Using less than label rates of water is not itself a violation of the Pest Control Products Act. However, if problems such as poor performance or spray drift occur the applicator could be held liable. Growers should carefully monitor the foliage including the lower stems and undersides of lower leaves to ensure thorough coverage. Water sensitive spray cards are available to assist in carrying out this task. Also monitor spray drift.

Roundup is used to control weeds when preparing fields for ginseng. The label spray volume is 50-300 L/ha (20-120 L/acre).

Table 1. Spray Volumes for Ginseng

| Product | Label | Boom 3 & 4 year ² | Boom 1 & 2year ² | Boom+drops ¹ 3 & 4year ² | Boom+drops ¹ 1 & 2year ² |
|---------|---------------|---------------------------------|--------------------------------|---|---|
| Aliette | min 80 L/acre | 80-300 L/acre | 80-300 L/acre | 80-300 L/acre | 80-300 L/acre |
| Bravo | 90-650 L/acre | 600 L/acre | 300 L/acre | 300-400 L/acre | 150-300 L/acre |
| Dithane | 800 L/acre | 600 L/acre | 300 L/acre | 300-400 L/acre | 150-300 L/acre |
| Dyrene | 800 L/acre | 600 L/acre | 300 L/acre | 300-400 L/acre | 150-300 L/acre |
| Rovral | 800 L/acre | 600 L/acre | 300 L/acre | 300-400 L/acre | 150-300 L/acre |

¹Boom + drops; refers to booms equipped with drop pendants between the beds (Figure 30 page 81)

²1 & 2 year and 3 & 4; refers to the age of the ginseng plants in the garden.

PESTICIDE APPLICATION RATE

Application rates on pesticide labels were established to be effective for mature plants. For foliar sprays, it may be possible to reduce the application rate for younger (smaller) plants. The Bravo 500 label (15723) provides a range of rates (2.4 – 4.8 kg/ha) without explaining when to use the low or high rate; the age of the ginseng crop is a plausible reason. The Dithane DG label (20553) provides a fixed application rate of 4.4 kg/ha, however growers and researchers have noticed phytotoxicity problems in one and two year gardens when the full rate has been applied. Half rates are suggested to avoid the phytotoxicity problem in one and two year old gardens. There have been no phytotoxicity problems, associated with application rates, reported in ginseng for Aliette, Bravo, Dyrene and Rovral. Dyrene can cause phytotoxicity when applied during high temperatures. If applicators reduce the pesticide application rates from those on the label, the applicators are assuming responsibility for any lack of efficacy.

ALIETTE[®] WDG (fosetyl AL)—for Ginseng

1. Formulation and Registrant

Aliette WDG—water dispersible granules,
PCP No. 24458

Active ingredient—fosetyl-AL 80%, 2.26 kg bag.

Bayer Crop Science Canada

100, 3131 - 114 Ave S.E. Calgary Alberta T2Z 3X2

1-888-283-6847

2. How it Works

Aliette, is a systemic fungicide that moves upwards and downwards in the plant. It is most effective when applied as a preventive treatment. It has curative abilities against *Phytophthora* root rot and foliar blight, and some activity against *Alternaria* leaf blight. It is registered to control *Phytophthora* root rot. When Aliette is taken up by the plant, it stops plant infection by inhibiting spore germination and the penetration of the pathogen into the plant. In already infected plants, it blocks mycelial development and sporulation so the fungus cannot reproduce to spread further. Aliette reinforces the defensive reactions of the plant so the hypersensitive response can seal off the invading organism. The activity against fungi occurs once the plant has taken up the fungicide. Aliette needs healthy green tissue to get inside the plant. It is rapidly translocated and gives protection to the growing points of the plant—from leaves to root hairs.

Aliette has some efficacy against *Alternaria* but research in Wisconsin showed that alone it was not enough to provide complete control. Use other fungicides to protect against *Alternaria*.

3. Use—When and How

The label says to apply at 5.5 kg /ha (2.2 kg/acre) in a minimum of 200 L water/ha (80 L/acre). See “Pesticide Application Options” on page 149 for further application information. Aliette can be applied as a foliar spray. It is most effective when used as a preventative fungicide, before the onset of infection. Make the first application at full emergence of plants. The final application has to be applied while foliage is still green. Apply a maximum of 5 times per year if required. Do not apply within 31 days of harvest. The maximum residue level is 0.1 ppm.

Do not spray in heavy dew or when rain is imminent. If the fungicide has dried onto the foliage it will not be washed off by rain.

In the spray tank, Aliette is unstable in acidic conditions (pH<2) and alkaline conditions (pH>9), but is stable from pH 5 to 9. When diluted in water, the pH can drop to pH 3-4 (acidic) so it should be applied immediately after mixing, or you should increase the pH. Use 3 kg. potassium carbonate per 5 kg. Aliette WDG, or 5 kg. diammonium phosphate per 5 kg. Aliette WDG to raise the

pH. A low pH solution can cause phytotoxicity if the solution is mixed with copper compounds or foliar fertilizers because of the resulting increase in available copper. If applying Aliette before or after a copper fungicide, the pH of the solution must be raised to pH 6.0. Fungicides which contain copper include copper oxychloride and copper sulphate, however these are not registered for use on ginseng. Use care when mixing with nitrogen based foliar fertilizers, especially those containing ammonium ions (NH₄⁺). Test small areas first to ensure compatibility. Aliette can be mixed with Rovral and Dithane M-45. Do not use with any spreader/sticker. Use a boom sprayer with cone nozzles at pressures between 700 and 2000 kPa (100 – 300 psi). Pressures above 1000 kPa (150 psi) may damage ginseng leaves, especially if younger plants. Drop pendants will improve the coverage of lower leaves in the plant canopy. Best applied as a foliar spray.

4. Acute Toxicity

LD₅₀ Oral = 4600 mg/kg (slight)

It is a mild eye irritant.

5. Precautions

Avoid breathing dust, and contact with skin eyes and clothing. Wear protective clothing while handling or spraying. Wash well after using. Keep out of reach of children.

**FOR POISONING SYMPTOMS, FIRST AID,
AND SAFETY PRECAUTIONS – READ LABEL!**

6. Environmental Considerations

It is harmless to bees when used as directed on the label and has low toxicity to fish and other aquatic organisms. It is very water soluble. Keep away from ponds, streams or other water sources. Do not apply where runoff into water bodies is likely to occur. Aliette has a short half-life in soil of 20 minutes in sandy loam soil and up to 90 minutes in heavier soils. This instability in soil provides for a low potential for leaching into groundwater.

7. Storage

Store in a dry, well-ventilated place away from seeds, fertilizer and foodstuff. Aliette will absorb moisture if left exposed, so keep in an airtight bag or container after opening. Do not use if product becomes lumpy.

8. Container Disposal

Empty bag thoroughly and make unusable for any other purpose. Dispose of containers according to the provincial government requirements, see page 76.

9. Disclaimer

Seller's guarantee shall be limited to the terms set out on the label and subject hereto The buyer assumes the risk to persons or property arising from the use or handling of this product and accepts the product on that condition.

BRAVO[®] 500 (chlorothalonil)—for Ginseng

1. Formulation and Registrant

Bravo 500—flowable, PCP No. 15723

Active ingredient—chlorothalonil 500 g/L, 10 litre container.

Syngenta Crop Protection Canada

140 Research Lane, Research Park, University of Guelph, Guelph, Ontario N1G 4Z3

1-800-665-9250 (Customer Resource Centre, West)

Emergency 1-800-327-8633 (Fastmed)

2. How It Works

Bravo is a protectant fungicide that controls a broad spectrum of plant diseases. It is registered for control of *Alternaria* leaf spot and *Botrytis* (grey mold). Good spray coverage is essential. Do not spray in heavy dew or when rain is imminent. The fungicide must be present on the plant prior to rainfall to prevent infection from occurring. If the fungicide has dried onto the foliage it will not be washed off by rain. Bravo has multi-site activity against fungi and so there is little chance for disease resistance to develop. Thorough uniform coverage is essential for disease control. Bravo will inhibit the germination of spores.

3. Use—When and How

The label says to apply 2.4 – 4.8 L/ha (1.0 – 2.0 L/acre). Apply in sufficient water and adequate pressure for thorough coverage. See “Pesticide Application Options” on page 149 for further application information. Start applications when disease threatens and repeat at 7-10 day intervals. Do not make more than six applications per season. Do not apply within 14 days of harvest. The maximum residue level is 0.1 ppm.

Bravo 500 is already formulated with a surfactant. Do not combine Bravo in the spray tank with pesticides, surfactants or fertilizers, unless your prior experience has shown the combination physically compatible and non-injurious under your conditions of use. The addition of oil-based surfactants may cause plant damage. Agitate the spray mixture in the tank while spraying.

Chlorothalonil is stable when the pH of the spray solution is between 5-9.

Use a boom sprayer with cone nozzles at pressures between 700 and 2000 kPa (100 – 300 psi). Pressures above 1000 kPa (150 psi) may damage ginseng leaves, especially if younger plants. Drop pendants will improve the coverage of lower leaves in the plant canopy.

4. Acute Toxicity

LD₅₀ Oral = >10,000 mg/kg (slight)

Causes severe eye damage. May cause temporary allergic reactions.

5. Precautions

Causes severe eye damage—use protective eye wear.

Avoid contact with skin or clothing. Avoid breathing mist. Keep out of reach of children

FOR POISONING SYMPTOMS, FIRST AID, AND DETAILED SAFETY PRECAUTIONS—READ LABEL!

6. Environmental Considerations

Chlorothalonil is highly toxic to fish. It is practically non-toxic to birds and is non-toxic to bees. It is not readily water soluble and has a low potential to leach into groundwater. Avoid contamination of water sources. Do not apply where runoff into water bodies is likely to occur.

7. Storage

Store product in a well ventilated, cool place.

Do not allow to become wet or overheated.

8. Container Disposal

Do not reuse pesticide containers. Dispose of containers according to the provincial government requirements.

9. Disclaimer

Seller's guarantee shall be limited to the terms set out on the label and subject hereto The buyer assumes the risk to persons or property arising from the use or handling of this product and accepts the product on that condition.

DiPel® 2X —DF for Ginseng

1. Formulation and Registrant

DiPel® 2X DF.

Dry flowable (wetttable granules) PCP # 26508

Active ingredient *Bacillus thuringiensis* subsp. *kurstaki*, Strain HD1, 32,000 International units of potency per. Mg. (equivalent to 32 billion International Units of potency / kg)

Valent BioSciences Canada Ltd., 1 Adelaide Street, East, suite 2901, Toronto, Ontario M5C 2V9

Richard Groen, richard.groen@valent.com

Phone 905 659-0886, Fax 905 659-0885

Emergency Phone No. 1-800-327-8633 (FASTMED)
(For environmental and health information only)

2. How It Works

DiPel® 2X DF is a biological insecticide, registered for leafrollers and must be ingested by the larval stage of the insect to be effective.

3. Use – How and When

DiPel® 2X DF must be applied when the larvae are in the early instar stage. Application rate is 0.5-1.1 kg/ha, with only two applications allowed per year. It should be applied in 760-1250L/ha of water. Apply the second application if infestation is heavy or egg hatch is asynchronous.

4. Acute Toxicity

Oral LD50 = it is considered as having no hazard to humans, animals, birds, fish, bees, or to predatory or parasitic insects, according to the 'Handbook for Pesticide Applicators and Dispensers', British Columbia Environment.

5. Precautions

Even though this product is considered non-toxic it is still advisable to use precautions and common sense. Keep out of reach of children and avoid inhalation and skin contact as with other chemicals. Wash thoroughly with soap and water after handling, change clothing and wash the clothing used before it is reused.

If eye contact is made, flush with plenty of water and if irritation persists, contact your doctor, taking product label or name with you.

6. Environmental Considerations

Every effort should be made to avoid spills and in case of a spill you should contact the manufacturer or provincial regulatory agency for proper cleanup procedures.

Do not apply through an irrigation system.

A spreader sticker is approved for use with this product but should not be needed on ginseng.

Thorough coverage is needed as it is an ingested product.

Do not apply under windy conditions, over 5 km/hr

This control product is to be used only in accordance with the directions on the label. It is an offence under the Pest Control Products Act to use a control product under unsafe conditions.

7. Storage

Do not expose to temperatures below 0°C or above 24°C. Store in original container, upright and tightly closed, in a safe place. Use within 24 months from the date of manufacture.

8. Container Disposal

Do not re-use pesticide containers. Make the empty container unsuitable for further use. Dispose of container in accordance with provincial government requirements.

9. Disclaimer

Seller's guarantee shall be limited to the terms set out on the label and subject hereto The buyer assumes the risk to persons or property arising from the use or handling of this product and accepts the product on that condition.

